

## CLAIMS

1. A hologram recording and reproducing system comprising: a supporting unit for freely attachably supporting a recording medium including a photosensitive material; a signal light-generating unit for projecting a coherent light beam modulated according to a predetermined data into the recording medium and generating a diffraction grating by providing a three-dimensional light interference pattern in the recording medium; a detector unit for detecting and photoelectrically converting a diffracted light from the diffraction grating; and a demodulating unit for demodulating a predetermined data from an output from the detector unit, the hologram recording and reproducing system characterized in that: the detector unit has an intermediate data-generating unit for generating an intermediate data, and the demodulating unit has a conversion table in which the intermediate data and the predetermined data are uniquely associated, and demodulates the predetermined data by performing an operation based on a correlation in the conversion table, and in that: at the time of recording of the hologram recording and reproducing system, the predetermined data of image is recorded in the recording medium as the interference pattern of Fourier transformed pattern formed with an optical system, and at the time of reproducing, inverse Fourier transform is performed by the detector unit and the demodulating unit to reproduce the predetermined data of image.

2. The hologram recording and reproducing system according

to claim 1, characterized in that the signal light-generating unit includes a reference light-generating unit for projecting a coherent reference light beam being the coherent light beam and having a first wavelength into the recording medium, modulates a coherent signal light beam being the coherent light beam and having the first wavelength according to the predetermined data, illuminates the recording medium with the signal light beam so that the signal light beam intersects the reference light beam within the recording medium, and generates a three-dimensional light interference pattern with the reference light beam.

3. The hologram recording and reproducing system according to claim 1 or 2, characterized in that the signal light-generating unit has a spatial light modulator, the detector unit has a photo-detector being the intermediate data-generating unit for generating the intermediate data, a light-receiving face of the photo-detector being disposed in the vicinity of a Fourier plane, and the recording medium is disposed in an upstream of the photo-detector.

4. The hologram recording and reproducing system according to claim 1 or 2, characterized in that the signal light-generating unit has a spatial light modulator, and the detector unit has an inverse Fourier transform lens, a reference data-holding hologram disposed at a focal point position of the inverse Fourier transform lens, and a position sensor that receives a diffracted light from the reference data-holding hologram and is disposed at a position spaced apart by a predetermined distance from the

reference data-holding hologram, the position sensor being the intermediate data-generating unit for generating the intermediate data.